SEQUENCE LISTING

<110> BAKALETZ, et al.

<120> NONTYPEABLE HAEMOPHILUS INFLUENZAE VIRULENCE FACTORS

<130> 28335/39196A

<140> To be assigned
<141> Herewith

<150> US 60/458,234
<151> 2003-03-27

<160> 41

<170> PatentIn version 3.2

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Glu Asn Gly Leu Thr Tyr Cys Thr His Ala Ser Gly Phe Ser Phe Asn
35 40 45

Pro Gln Thr Ala Asp Ala Gly Thr Ser Met Asn Val Val Thr Glu Gln
50 55 60

Ile Tyr Asn Lys Leu Phe Asp Ile Lys Asn His Ser Ala Thr Leu Thr
65 70 75 80

Pro Met Leu Ala Gln Ser Tyr Ser Ile Ser Ala Asp Gly Lys Glu Ile
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Leu Leu Asn Leu Arg His Gly Val Lys Phe His Gln Thr Pro Trp Phe
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Thr Pro Thr Arg Asp Phe Asn Ala Glu Asp Val Val Phe Ser Ile Asn
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Val Thr Tyr Ser Asn Pro Gln Tyr Arg Val Phe His Glu Gln Ala Arg
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Lys Val Arg Phe Pro Tyr Phe Asp Ser Ile Lys Leu Asn Glu Lys Ile
                165                 170                 175

Lys Ser Val Thr Ala Leu Ser Pro Tyr Gln Val Lys Ile Glu Leu Phe
            180                 185                 190

Ala Pro Asp Ser Ser Ile Leu Ser His Leu Ala Ser Gln Tyr Ala Ile
        195                 200                 205

Ile Phe Ser Gln Glu Tyr Ala Tyr Gln Leu Ser Ala Asp Asp Asn Leu
    210                 215                 220

Ala Gln Leu Asp Thr His Pro Val Gly Thr Gly Pro Tyr Gln Val Lys
225                 230                 235                 240

Asp Tyr Val Tyr Asn Gln Tyr Val Arg Leu Val Arg Asn Glu Asn Tyr
                245                 250                 255

Trp Lys Lys Glu Ala Lys Ile Glu His Ile Ile Val Asp Leu Ser Thr
            260                 265                 270

Asp Arg Ser Gly Arg Leu Val Lys Phe Phe Asn Asn Glu Cys Gln Ile
        275                 280                 285

Ala Ser Tyr Pro Glu Val Ser Gln Ile Gly Leu Leu Lys Asn Asp Asp
    290                 295                 300

Lys His Tyr Tyr Met Gln Ser Thr Asp Gly Met Asn Leu Ala Tyr Leu
305                 310                 315                 320

Ala Phe Asn Phe Asp Lys Pro Leu Met Arg Asp His Glu Ile Arg Ala
                325                 330                 335

Ala Ile Ser Gln Ser Leu Asn Arg Ala Arg Ile Ile His Ser Ile Tyr
            340                 345                 350

His Asn Thr Ala Thr Val Ala Asn Asn Ile Ile Pro Glu Val Ser Trp
        355                 360                 365

Ala Ser Thr Val Asn Thr Pro Glu Phe Glu Phe Asp Tyr His Pro Lys
    370                 375                 380
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Ile Ala Lys Asn Lys Leu Ala Asp Lys Asn Leu Leu Leu Asn Leu Trp
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Glu Met Ile Lys Trp Asp Leu Ala Gln Ala Gly Val Lys Val Lys Val
            420                 425                 430

Arg Ala Val Thr Arg Pro Phe Leu Thr Ala Gln Leu Arg Asn Gln Ser
        435                 440                 445

Glu Asn Tyr Asp Leu Ile Leu Ser Gly Trp Leu Ala Gly Asn Leu Asp
    450                 455                 460

Pro Asp Gly Phe Met Arg Pro Ile Leu Ser Cys Gly Thr Lys Asn Glu
465                 470                 475                 480

Leu Thr Asn Leu Ser Asn Trp Cys Asn Glu Glu Phe Asp Gln Phe Met
                485                 490                 495

Asp Arg Ala Ile Thr Thr Ser His Leu Ser Ser Arg Ala Lys Ala Tyr
            500                 505                 510

Asn Glu Ala Gln Glu Leu Val Leu Arg Glu Leu Pro Ile Ile Pro Ile
        515                 520                 525

Ala Asn Val Lys Arg Ile Leu Val Ala Asn Ser Arg Val Lys Gly Val
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Gln Glu Lys His
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            20                  25                  30
```

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Asn Ala Asn Leu Val Thr Gln Asn Ile Tyr Ile Gly Tyr Phe His Tyr
        35                  40                  45

Leu Gly Thr Leu Leu Gln Gly Asp Phe Gly Ile Thr Tyr Asn Gly Gly
    50                  55                  60

Lys Ser Leu Met Asn Leu Ile Leu Thr Val Leu Pro Pro Thr Leu Glu
65                  70                  75                  80

Leu Cys Phe Ile Thr Leu Phe Leu Ala Phe Ile Phe Gly Leu Pro Leu
                85                  90                  95

Gly Ile Ile Ser Ala Val Asn Ser Glu Gln Val Phe Ala Lys Ser Leu
            100                 105                 110

Gln Ile Leu Ser Tyr Val Gly Leu Ser Ile Pro Ile Phe Trp Leu Ala
        115                 120                 125

Pro Ile Leu Leu Tyr Val Ala Ala Leu Ser His Trp Glu Ile Ala Ala
    130                 135                 140

Ile Gly Gln Tyr Asn Leu Leu Tyr Glu Ile Lys Pro Ile Thr Gly Phe
145                 150                 155                 160

Pro Val Ile Asp Met Trp Phe Met Glu Val Pro Tyr Arg Thr Lys Ile
                165                 170                 175

Val Gln Asn Ile Leu Gln His Leu Ala Leu Pro Thr Leu Val Leu Cys
            180                 185                 190

Ile Leu Pro Thr Met Glu Ile Ile Arg Ile Ile His Gln Arg Ala Glu
        195                 200                 205

Tyr Ile Leu Asn Gln Asn Phe Ser Lys Val Ala Thr Thr Arg Gly Trp
    210                 215                 220

Ser Lys Trp Lys Ile Leu His Gln Tyr Val Phe Arg Asn Thr Phe Pro
225                 230                 235                 240

Leu Leu Val Pro Gln Val Pro Arg Val Phe Thr Leu Val Leu Thr Gln
                245                 250                 255

Cys Met Leu Val Glu Thr Ala Leu Gly Trp Pro Gly Ile Gly Arg Trp
            260                 265                 270

Leu Ile Asn Ala Val Asn Glu Gln Asp Tyr Asn Ser Ile Ala Ala Gly
        275                 280                 285
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Val Ile Val Ile Gly Val Cys Ile Ile Leu Ile Asp Thr Phe Thr Lys
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            20                  25                  30

Tyr Leu Leu Ile Ala Leu Ile Phe Thr Ala Leu Phe Ala Ser Tyr Leu
        35                  40                  45

Ala Pro Tyr Ala Asp Asn Arg Gln Phe Ile Gly Gln Glu Leu Met Pro
    50                  55                  60

Pro Ser Trp Val Asp Arg Gly Lys Ile Ala Phe Phe Phe Gly Thr Asp
65                  70                  75                  80

Asp Leu Gly Arg Asp Ile Leu Ser Arg Leu Ile Met Gly Thr Arg Tyr
                85                  90                  95

Thr Leu Gly Ser Ala Leu Leu Val Val Phe Ser Val Ala Ile Ile Gly
            100                 105                 110

Gly Ala Leu Gly Ile Ile Ala Gly Leu Leu Lys Gly Ile Lys Ala Arg
        115                 120                 125

Phe Val Gly His Ile Phe Asp Ala Phe Leu Ser Leu Pro Ile Leu Leu
    130                 135                 140

Ile Ala Val Val Ile Ser Thr Leu Met Glu Pro Ser Leu Trp Asn Ala
145                 150                 155                 160

Met Phe Ala Thr Leu Leu Ala Ile Leu Pro Tyr Phe Ile His Thr Ile
                165                 170                 175

Tyr Arg Ala Ile Gln Lys Glu Leu Glu Lys Asp Tyr Val Val Met Leu
            180                 185                 190
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Lys Leu Glu Gly Ile Ser Asn Gln Thr Leu Leu Lys Ser Thr Ile Leu
        195                 200                 205

Pro Asn Ile Thr Val Ile Tyr Ile Gln Glu Val Ala His Ala Phe Val
    210                 215                 220

Ile Ala Val Leu Asp Ile Ser Ala Leu Ser Phe Ile Ser Leu Gly Ala
225                 230                 235                 240

Gln Arg Pro Thr Pro Glu Trp Gly Ala Met Ile Lys Asp Ser Leu Glu
                245                 250                 255

Leu Leu Tyr Leu Ala Pro Trp Thr Val Leu Leu Pro Gly Phe Ala Ile
            260                 265                 270

Ile Phe Thr Ile Leu Leu Ser Ile Ile Phe Ser Asn Gly Leu Thr Lys
        275                 280                 285

Ala Ile Asn Gln His Gln Glu
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            20                  25                  30

Gly Glu Ile Ser Gly Leu Val Gly Glu Ser Gly Ser Gly Lys Ser Leu
        35                  40                  45

Ile Ala Lys Val Ile Cys Asn Ala Ile Lys Glu Asn Trp Ile Ile Thr
    50                  55                  60

Ala Asp Arg Phe Arg Phe His Asp Ile Glu Leu Leu Lys Leu Ser Pro
65                  70                  75                  80

Asn Lys Arg Arg Lys Ile Val Gly Lys Glu Ile Ser Met Ile Phe Gln
                85                  90                  95

Asn Pro Leu Ser Cys Leu Asp Pro Ser Arg Lys Ile Gly Lys Gln Leu
            100                 105                 110
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```
Ile Gln Asn Ile Pro Asn Trp Thr Phe Lys Asn Lys Trp Trp Lys Trp
        115                 120                 125

Phe Gly Trp Lys Lys Arg Arg Ala Ile Glu Leu Leu His Arg Val Gly
    130                 135                 140

Ile Lys Asp His Arg Asp Ile Met Ala Ser Tyr Pro Asn Glu Leu Thr
145                 150                 155                 160

Glu Gly Glu Gly Gln Lys Val Met Ile Ala Met Ala Val Ala Asn Gln
                165                 170                 175

Pro Arg Leu Leu Ile Ala Asp Glu Pro Thr Asn Thr Leu Glu Ser Thr
            180                 185                 190

Thr Ala Leu Gln Val Phe Arg Leu Leu Ser Ser Met Asn Gln Asn Gln
        195                 200                 205

Gly Thr Thr Ile Leu Leu Thr Ser Asn Asp Ile Lys Ser Ile Ser Glu
    210                 215                 220

Trp Cys Asp Gln Ile Ser Val Leu Tyr Cys Gly Gln Asn Thr Glu Ser
225                 230                 235                 240

Ala Pro Thr Glu Ile Leu Ile Glu Ser Pro His His Pro Tyr Thr Gln
                245                 250                 255

Ala Leu Ile Asn Ala Val Pro Asp Phe Thr Gln Pro Leu Gly Phe Lys
            260                 265                 270

Thr Lys Leu Gly Thr Leu Glu Gly Thr Ala Pro Ile Leu Glu Gln Met
        275                 280                 285

Pro Ile Gly Cys Arg Leu Gly Pro Arg Cys Pro Phe Ala Gln Lys Lys
    290                 295                 300

Cys Met Glu Lys Pro Arg Arg Leu Lys Ile Lys Gln His Glu Phe Ser
305                 310                 315                 320

Cys His Tyr Pro Ile Asn Leu Arg Glu Lys Asn Phe Lys Glu Lys Thr
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Thr Ala Thr Pro Phe Ile Leu Asn Cys Lys Gly Asn Glu
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<213> Homo sapiens

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            20                  25                  30

Phe Thr Leu Glu Arg Lys Gln Thr Leu Ala Ile Ile Gly Asn Asn Gly
        35                  40                  45

Ser Gly Lys Ser Thr Leu Val Lys Met Ile Ala Gly Ile Ile Pro Pro
    50                  55                  60

Thr Ser Gly Arg Ile Leu Phe Asn Asp Arg Glu Leu Gln Tyr Gln Asp
65                  70                  75                  80

Ala Gln Ser Arg Ala Lys His Ile Arg Met Val Phe Gln Asp Ala Asn
                85                  90                  95

Ser Ala Phe Asn Pro Arg Leu Asn Ile Gly Gln Ile Leu Asp Glu Pro
            100                 105                 110

Leu Ser Leu Ala Thr Asp Trp Thr Glu Thr Gln Arg Asn Glu Lys Ile
        115                 120                 125

Phe Glu Thr Leu Ser Leu Val Gly Leu Tyr Pro Asp Tyr Thr Asn Leu
    130                 135                 140

Asn Ile Lys His Leu Ser Ile Ser Gln Lys Gln Arg Val Ala Leu Ala
145                 150                 155                 160

Arg Ala Leu Ile Leu Ala Pro Glu Ile Ile Ile Ile Asp Asp Ala Ile
                165                 170                 175

Gly Asn Leu Asp Ala Ser Val Arg Ile Gln Leu Leu Asn Leu Thr Leu
            180                 185                 190

Asp Leu Gln Gln Arg Leu Gly Ile Ser Tyr Ile Tyr Val Gly Gln Asp
        195                 200                 205

Leu Gly Val Ile Lys His Ile Ala Asp Thr Ile Ile Val Met Asp Asp
    210                 215                 220

Gly Lys Met Ile Glu Tyr Gly Ser Pro Gln Asn Leu Phe Thr Asp Pro
225                 230                 235                 240
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Gln Thr Asp Val Thr Arg Arg Leu Val Glu Ser Tyr Phe Gly Lys Ile
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Leu Asp Glu Thr Ala Trp Val Lys Asp Lys Asn Thr His
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            20                  25                  30

His Ile Ser Ala Leu Ile Ile Ala Ile Leu Leu Gly Met Ala Ile Gly
        35                  40                  45

Asn Thr Ile Tyr Pro Gln Phe Ser Thr Gln Val Glu Lys Gly Val Leu
    50                  55                  60

Phe Ala Lys Gly Thr Leu Leu Arg Thr Gly Ile Val Leu Tyr Gly Phe
65                  70                  75                  80

Arg Leu Thr Phe Gly Asp Ile Ala Asp Val Gly Leu Asn Ala Val Val
                85                  90                  95

Thr Asp Ala Ile Met Leu Ile Ser Thr Phe Phe Leu Thr Ala Leu Leu
            100                 105                 110

Gly Ile Arg Tyr Leu Lys Met Asp Lys Gln Leu Val Tyr Leu Thr Gly
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Tyr Lys Lys Phe Asp Val Leu Val Val Thr Thr Ser Arg Asn Gly His
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Lys Lys Val Leu Asn Gly Lys Glu Phe Ala Arg Ile Asn Asn Gly Thr
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35 40 45

Asn Val Ser Glu Gln Leu Glu Gln Ile Asn Val Ser Gly Ser Thr Glu
50 55 60

Asn Ser Asp Thr Lys Thr Pro Pro Lys Ile Ala Glu Thr Val Lys Thr
65 70 75 80

Ala Lys Thr Leu Glu Arg Glu Gln Ala Asn Asn Ile Lys Asp Ile Val
85 90 95

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Lys Tyr Glu Thr Gly Val Thr Val Val Glu Ala Gly Arg Phe Gly Gln
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Ser Gly Phe Ala Ile Arg Gly Val Asp Glu Asn Arg Val Ala Ile Asn
        115                 120                 125

Ile Asp Gly Leu Arg Gln Ala Glu Thr Leu Ser Ser Gln Gly Phe Lys
    130                 135                 140

Glu Leu Phe Glu Gly Tyr Gly Asn Phe Asn Asn Thr Arg Asn Gly Ala
145                 150                 155                 160

Glu Ile Glu Thr Leu Lys Glu Val Asn Ile Thr Lys Gly Ala Asn Ser
                165                 170                 175

Ile Lys Ser Gly Ser Gly Ser Leu Gly Gly Ser Val Ile Tyr Lys Thr
            180                 185                 190

Lys Asp Ala Arg Asp Tyr Leu Leu Asn Lys Asp Tyr Tyr Val Ser Tyr
        195                 200                 205

Lys Lys Gly Tyr Ala Thr Glu Asn Asn Gln Ser Phe Asn Thr Leu Thr
    210                 215                 220

Leu Ala Gly Arg Tyr Lys Lys Phe Asp Ala Leu Val Val Thr Thr Ser
225                 230                 235                 240

Arg Asn Gly His Glu Leu Glu Asn Tyr Asp Tyr Lys Asn Ala Asn Ser
                245                 250                 255

Leu Thr Gln Gly Lys Lys Arg Glu Lys Ala Asp Pro Tyr Lys Ile Glu
            260                 265                 270

Gln Asp Ser Thr Leu Leu Lys Leu Ser Phe Asn Pro Thr Glu Asn His
        275                 280                 285

Arg Phe Thr Leu Ala Ala Asp Leu Tyr Glu His Arg Ser Arg Gly Gln
    290                 295                 300

Asp Leu Ser Tyr Thr Leu Lys Tyr Gln Lys Thr Asp Pro Asn Leu Leu
305                 310                 315                 320

Glu Val Asp Ser Arg His Thr Asn Asp Lys Thr Lys Arg Arg Asn Ile
                325                 330                 335

Ser Phe Ser Tyr Glu Asn Phe Ser Gln Thr Pro Phe Trp Asp Thr Leu
            340                 345                 350
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Lys Ile Thr Tyr Ser Asp Gln Arg Ile Lys Thr Arg Ala Arg Thr Asp
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Asp Tyr Cys Asp Ala Gly Val Arg Tyr Cys Glu Gly Thr Ala Asn Pro
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Ala Gly Leu Lys Leu Thr Asp Gly Lys Ile Thr Arg Arg Asp Gly Ser
385 390 395 400

Glu Leu Gln Phe Glu Lys Lys Asp Lys Asn Ile Asp Asn Asn Ile Tyr
405 410 415

Asp Phe Asp Lys Phe Ile Asp Thr Asp Asp Arg Val Ile Glu Gly Lys
420 425 430

Leu Gly Leu Arg Arg Ser Ser Gly Thr Trp Tyr Asp Cys Ser Ile Phe
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Asp Cys Lys Asp Lys Thr Lys Met Lys Ile Phe Glu Thr Glu His Pro
450 455 460

Tyr Gly Tyr Gly Thr Thr Gly Thr Trp Lys Lys Asp Phe Glu Leu Glu
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Asn Lys Thr Tyr Ser Ile Leu Pro Ser Ser Pro Gly Tyr Leu Glu Arg
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Leu Trp Gln Glu Arg Asp Leu Asp Thr Asn Thr Gln Gln Leu Asn Leu
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Asp Leu Thr Lys Asp Phe Lys Thr Trp Arg Val Glu His Asn Leu Gln
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Tyr Gly Ser Ser Tyr Asn Thr Thr Met Lys Arg Met Val Asn Arg Ala
545 550 555 560

Gly Asn Asp Ala Ser Asp Val Gln Trp Trp Ala Glu Pro Thr Leu Gly
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Tyr Ser Leu Leu Tyr Asp Lys Pro His Thr Cys Lys Thr Ala Tyr Gly
580 585 590

Gly Trp Lys Ala Asn Leu Cys Pro Arg Val Asp Pro Lys Phe Ser Phe
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Leu Leu Pro Ile Lys Thr Lys Glu Lys Ser Val Tyr Leu Phe Asp Asn
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Val Val Ile Thr Asp Tyr Leu Ser Phe Asp Leu Gly Tyr Arg Tyr Asp
625                 630                 635                 640

Asn Ile His Tyr Gln Pro Lys Tyr Lys His Gly Val Thr Pro Lys Leu
                645                 650                 655

Pro Asp Asp Ile Val Lys Gly Leu Phe Ile Pro Leu Pro Ser Gly Lys
            660                 665                 670

Asn Asn Asn Asp Asp Pro Glu Val Lys Lys Asn Val Gln Gln Asn Ile
        675                 680                 685

Asp Tyr Ile Ala Lys Gln Asn Lys Lys Tyr Lys Ala His Ser Tyr Ser
    690                 695                 700

Phe Val Ser Thr Ile Asp Pro Thr Ser Phe Leu Arg Leu Gln Leu Lys
705                 710                 715                 720

Tyr Ser Lys Gly Phe Arg Ala Pro Thr Ser Asp Glu Met Tyr Phe Thr
                725                 730                 735

Phe Lys His Pro Asp Phe Thr Ile Leu Pro Asn Thr Asn Leu Lys Pro
            740                 745                 750

Glu Ile Ala Lys Thr Lys Glu Ile Ala Phe Thr Leu His Asn Asp Asp
        755                 760                 765

Trp Gly Phe Ile Ser Thr Ser Leu Phe Lys Thr Asn Tyr Lys Asn Phe
    770                 775                 780

Ile Asp Leu Ile Phe Lys Gly Glu Lys Asp Phe Lys Leu Val Ser Gly
785                 790                 795                 800

Gly Ser Thr Leu Pro Phe Ser Leu Tyr Gln Asn Ile Asn Arg Asp Ser
                805                 810                 815

Ala Val Val Lys Gly Ile Glu Ile Asn Ser Lys Val Phe Leu Gly Lys
            820                 825                 830

Met Ala Lys Phe Met Asp Gly Phe Asn Leu Ser Tyr Lys Tyr Thr Tyr
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Gln Lys Gly Arg Met Asp Gly Asn Ile Pro Met Asn Ala Ile Gln Pro
    850                 855                 860
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Lys Thr Met Val Tyr Gly Leu Gly Tyr Asp His Pro Ser Gln Lys Phe
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Gly Phe Asn Phe Tyr Thr Thr His Val Ala Ser Lys Asn Pro Glu Asp
                885                 890                 895

Thr Tyr Asp Ile Tyr Ala Lys Asp Lys Asn Gln Thr Asn Thr Ser Ile
            900                 905                 910

Lys Trp Arg Ser Lys Ser Tyr Thr Ile Leu Asp Leu Ile Gly Tyr Val
        915                 920                 925

Gln Pro Ile Lys Asn Leu Thr Ile Arg Ala Gly Val Tyr Asn Leu Thr
    930                 935                 940

Asn Arg Lys Tyr Ile Thr Trp Asp Ser Ala Arg Ser Ile Arg Ser Phe
945                 950                 955                 960

Gly Thr Ser Asn Val Ile Asp Gln Lys Thr Gly Gln Gly Ile Asn Arg
                965                 970                 975

Phe Tyr Ala Pro Gly Arg Asn Tyr Lys Met Ser Val Gln Phe Glu Phe
            980                 985                 990
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